Studia Anglica Posnaniensia XXIII, 1990

ON THE MONOTONICITY OF ADVERBIAL SENTENTIAL CONNECTION*

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ABSTRACT. Matters related to adverbial sentential connectives in English are examined in this paper. Monotonicity is seen in relation to adverbial clausal modification and is proposed as a differentiating tool among types of adverbial connection, except when a MIGHT conditional is implied. The data presented suggest that the various monotonicity patterns (created by certain elements contained in the antecedent and post-cedent clauses) result from a combination of a type of negation with such levels of analysis as ex/intensionality, illocutionary force, antecedent-consequent pair. Major differences between the English and Greek paradigms of adverbial connectives are taken into account.

1. QUANTIFIERS AND ADVERBIAL CLAUSAL CONNECTION

A general aim that concerns adverbial connection of sentences relates to the semantic characteristics of the various readings of the adverbial connectives. This aim could — at least partially — be accomplished by correlating the system of quantifiers with that of the connectives of adverbial modification.

The behaviour of certain connectives (causal, purposive, conditional, concessive) could be examined with respect to a property of both logical and natural language quantifiers, namely monotonicity.

Given a particular contextual assumption, causal, purposive, conditional and concessive connectives will be shown to be acceptable in a variety of monotonicity patterns created by elements in the ante- and post-cedent clauses. These patterns seem to correspond to the ones created by quantifiers in the presence of (a kind of) negation, ie. inner, outer negation, duality (van Benthem, 1984).

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* An early version of the present paper was presented at the 9th Conference of the Linguistics Department, Faculty of Philosophy, Aristotelian University of Thessaloniki, 18—20 April 1988, and has appeared in the Proceedings, in Greek.

The above adverbial connections will, thus, be shown to be associated with a type of negation at three levels of analysis:

— the actual verbal input of the utterance, in which case inner negation operates,

— the illocutionary force of the utterance, in which case outer negation operates, and

— extensional/intensional worlds, in which case duality negation operates. Monotonicity, thus, becomes a differentiating criterion between adverbial subordinative connectives.

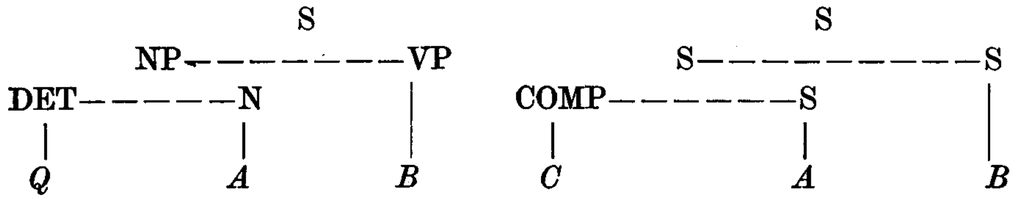
A correlation of the sys'em of quantifiers with that of adverbial connectives could perhaps be shown in terms of some quantificational force conveyed by the connectives in question, which sometimes relate to the universal quantifier and sometimes to the existential one. As in the case of quantifiers, the conditions that describe adverbial connection can be expressed in terms of mathematical sets:

———B——— ——C——— ———A———

He comes, when (ever) he likes to (=not always; only in a certain set of circumstances).

Quantifiers have been considered as DETS in Montague Semantics. A correlation between these two systems could also be justified in terms of the relatively similar syntactic structure they exhibit.

Table 1



If we decide that Qs in M are relations between subsets of M, in order for us to check the truth and falsity of the formulas $Q_M\,AB$ and $C_M\,AB$, we should be concerned with the part of B which is common to A.

In the example above, we are concerned with the set of circumstances B (=he comes) in which A (=he likes to).

2. MONOTONICITY

Binary quantifiers of natural and logical language have been examined as to their context-dependency, relational behaviour (properties like symmetry, transitivity, circularity etc.) and monotonicity behaviour.

The monotonicity behaviour of a quantifier (Westerståhl [1986: 71]) concerns the preservation of the truth value of the formula $Q\,AB$, when the arguments

(A, B) are decreased or increased.

1. ↑MON : $Q_M AB \;\&\; A \leqslant A' \Rightarrow Q_M A'B$
2. ↓MON : $Q_M AB \;\&\; A' \leqslant A \Rightarrow Q_M A'B$
3. MON↑ : $Q_M AB \;\&\; B \leqslant B' \Rightarrow Q_M A\,B'$
4. MON↓ : $Q_M AB \;\&\; B' \leqslant B \Rightarrow Q_M A\,B'$

A quantifier exhibits upward left monotone (or persistent) behaviour if the truth value of the formula is preserved when the left argument of the formula is replaced by one of its supersets. By contrast, it is downward left monotone (anti-persistent) if the truth value is preserved when the left argument is replaced by one of its subsets.

The universal quantifier is downward left monotone, because, if *all animals have legs* is true in

—Q—	——A——	———B———
	beings	
all	animals	have legs
	cats	

and we substitute *beings* for *animals* the truth value of the $Q\;M\;AB$ is not preserved (whereas, if we substitute *cats* for *animals*, it is).

The universal quantifier is upward right monotone, because, if *all animals walk* is true and we substitute *move* for *walk*, in

—Q—	——A——	——B——
		move
all	animals	walk
		....

the truth value of the formula is preserved (whereas, if it is true that *all animals move*, the truth of the sentence will not be preserved if *move* is replaced by *walk*).

Some is upward (left and right) monotone. If *some animals have legs* is true in

—Q—	——A——	———B———
	beings	
some	animals	have legs
	cats	

and we substitute *beings* for *animals*, then *some beings have legs* is also true. In

—Q—	——A——	——B——
		move
some	animals	walk
		....

if *some animals walk* is true, *some animals move* is also true.

Not all, thus, is upward left but downward right monotone and *no* is downward (left and right) monotone.

Monotonicity has been considered a candidate for a semantic universal and a cross-categorial property. It what follows, we shall attempt to show how a broader view of monotonicity could be relevant to distinguishing among adverbial subordinative connectives.

3. MONOTONICITY (MONTY) IN ADVERBIAL CLAUSAL SUBORDINATION

We shall now examine certain behaviour of connectives used in clausal adverbial modification. We shall use sentences containing scalar values so that some kind of monotonicity behaviour can be calculated. The sets of the scalar values we shall be using, which will substitute for A & B of the formula $C_M AB$, are two sets of values stating gradation of time duration and temperature.

$$A = \begin{vmatrix} \text{hot} \\ \text{warm} \\ \text{lukewarm} \\ \text{cold} \end{vmatrix} \qquad B = \begin{vmatrix} 1 \text{ hour} \\ 15' \\ 5' \\ 2' \end{vmatrix}$$

It should be noted that the monotonicity behaviour observed in the case of the connections containing the scalar values could be considered analogous to the one observed in the case of quantifiers, in the following sense:

— in the case of quantifiers we deal with monotonicity patterns defined in terms of SUBSETS and SUPERSETS of objects, whereas

— in the case of adverbial connection we deal with monotonicity patterns created in terms of the INCREASING or DECREASING VALUES of the scale used.

Monotonicity, in this broader sense, could be defined as follows:

— the direction of the monotonicity of a proposition will be UPWARD if some INCREASE of the (numerical) value of the varying item (ie. in this case, the item which denotes temperature or time) yields an acceptable sentence connection.

— the direction of the monotonicity of a proposition will be DOWNWARD if some DECREASE of the (numerical) value of the varying item yields an acceptable sentence connection. We shall have to account for the difference in monotonicity behaviour in sentences like the following (we shall be using certain temporal adverbs to make readings clear):

hot
warm
1. ↓MON↓ Since it is (still) lukewarm, (only) 5 min. must
cold
have passed (and maybe less...)

In some contexts the above connection can only be true if we decrease (↓) both the numerical value of temperature and time duration.

hot
warm
2. ↓MON↑ Since it is (still) lukewarm, 30 min. must have
cold
passed (and maybe more..)

In some contexts the above connection can only be true if we decrease (↓) the numerical value denoting temperature and increase (↑) the value denoting time duration.

hot
warm
3. ↑MON↓ Since it is (already)lukewarm, 10′ must have
cold
passed (and definitely 5′..)

In some contexts the above connection can only be true if we increase (↑) the value denoting temperature and decrease the one denoting time duration.

3.1. Causal/inference *Since*.

In this section, we shall draw the MONty behaviour of causal/inference *since* (and, indirectly, that of *because*, *if*, *whenever*):

Tea is already cold. We are making inferences about how much time has passed.

This kind of contextual information together with the speaker belief concerning how quickly water temperature changes is specified in the parenthesis below each connection.

1 hour
. . . . . 15 min.
4. ↓MON↑ Since it is (already) lukewarm, 5 min. must
cold
have passed (and possibly more..))
(=I am saying this ... because I know/believe that
tea gets cold quickly)

The underlined phrases in the parenthesis, in ex. (4) above, will be omitted in the connections to follow.

hot

5. ↑MON↓ Since it is (still) warm, (only) 5 min. must have

. . . .

passed (and less..)
(=..because tea gets cold quickly)

In the following examples values are altered analogously, in contrast to the previous ones, in which that was not the case: the more time passed, the more the tea temperature decreased. In what follows, we shall be concerned about how quickly *water gets warm*: by contiast, in this case, the more time passes, the more water temperature increases.

hot

6. ↑MON↑ Since it is (already) warm, quite some time

. . . .

must have passed.
(=..because water gets warm slowly)

. . . . . .

7. ↓MON↑ Since it is (still) lukewarm, quite some time must
cold
have passed (30 min. and possibly more)
(=..because water gets warm slowly)

hot

8. ↑MON↓ Since it is (already) warm, quite a short time

. . . .

must have passed (15 min. and perhaps less..)
(=..because water gets warm quickly)

. . . . . .

9. ↓MON↓ Since it is (still) lukewarm, a short time must
cold
have passed (5 min. and less..)
(=..because water usually gets warm quickly)

The direction pattern of MONty in the above examples is summarised in Table 2.

Table 2

GETS WARM quickly hot		GETS WARM slowly hot		GETS COLD quickly cold	
already	not yet	already	not yet	already	not yet
↑MON↓	↓MON↓	↑MON↑	↓MON↑	↓MON↑	↑MON↓
(8)	(9)	(6)	(7)	(4)	(5)

The factors which seem to influence the direction of MONty are

— the information that *the water has already got warm* or *has not got warm yet*,

— a change in the speaker's view about whether water gets warm *quickly* or *slowly*, and

— the change from *getting cold* into *getting warm*.

These successive alternations influenced the direction of some part of MONty:

— the alteration of *got cold* into *got warm*, given that the rest of the factors are kept constant, influenced both, sides (8—4) of MONty,

— the alteration of *quickly* into *slowly* influenced right MONty only (8—6), and

— the alteration of *already warm* into *not yet warm* influenced left MONty only (8—9).

Alterations in the direction of MONty have been shown to be due to the presence of operators like negation. It has been noted that (van Benthem [1983c] in Westerståhl [1986: 71]), in the Square of Oppositions, inner negation reverses right MONty (all-no), outer negation reverses both left and right (all-some) and duality only left (no-not all).

3.2. *Although*

We shall examine the direction of MONty of the same antecedent-consequent pair with an *although* (instead of a causal/inference *since*) connective, in order to show what kind of changes will be caused.

What we would expect is tha t*although* would alter right MONty only (according to what has been observed in van Benthem [1983c]), as inner negation has to be combined with either the [proposition p or the proposition q of a *since* connection in order for *although* to become acceptable:

←—*C*—	———*p*———	———*q*———
Since	he is young	he can read it
Although	he is not young,	he can read it.

hot

10. ↑MON↓ Although it is warm, quite a short time must have

. . . . .

passed. (=..because it gets warm quickly)

. . . . . .

11. ↓MON↑ Although it is (still) lukewarm, quite some time
cold
must have passed (=..because it gets warm quickly)

hot
warm
12. ↑MON↓ Although it is (already) lukewarm (—and I don't
. . . . . .

think he'll like it-), quite a short time must have passed
(=..because it gets warm slowly)

. . . . . .

13. ↓MON↑ Although it is (still) lukewarm (and you believe
cold
that a short time has passed), I suppose that quite some time has passed.
(=...because it gets warm slowly)

. . . . . .

14. ↓MON↓ Although it is (already) lukewarm, quite a
cold
short time must have passed.
(=...because tea gets cold quickly)

hot
15. ↑MON↑ Although it is (still) warm, quite some time must
. . . . . .

have passed
(=...because tea usually gets cold quickly)

The direction pattern of MONty in the above examples with *although* is contrasted to that of causal/inference *since* in Table 3.

Table 3

	GETS WARM quickly (hot)		GETS WARM slowly (hot)		GETS COLD quickly (cold)	
	already	not yet	already	not yet	already	not yet
since	↑MON↓	↓MON↓	↑MON↑	↓MON↑	↓MON↑	↑MON↓
although	↑MON↓	↓MON↑	↑MON↓	↓MON↑	↓MON↓	↑MON↑
	(10)	(11)	(12)	(13)	(14)	(15)

One can observe that *although* either preserves the direction of MONty of the original connection with *since* (10, 13) or changes right MONty (11, 12, 14, 15). In Table 4 below, I shall indicate with a (+) and a (—) the pattern created with the interference of negation which makes the use of *although* (in place of *since*) acceptable.

Table 4

EX.	CONNECT.	NEGATION INTERFERENCE PATTERN (warm)	(little)	(quickly)	(gets warm)	MONty AREA
8	since	+	—	+	+	A:
10	although	+	—	+	+	S
		(cold	much	slowly	gets warm)	A
7	since	—	+	—	+	M
13	although	—	+	—	+	E
9	since	—	—	+	+	AREA
11	although	—	+	+	+	B:
6	since	+	+	—	+	D
12	although	+	—	—	+	I
						F
5	since	+	—	+	—	F
15	although	+	+	+	—	E
						R
4	since	—	+	+	—	E
14	although	—	+	—	—	N
						T

In area B (where a change in the connective reverses MONty), *although* either interferes
— to create a contrast *within the sentence* (9—11, 6—12), or
— to create a contrast related to *beliefs in the speaker's world* (4—14), or
— to make a *contrast disappear* (5—15.

Whatever the changes that make the use of *although* acceptable are, the change of the causal connective into a concessive one seems to be taking place along one of the horizontal axes of a square (as in the Square of Oppositions presented below (Table 5)), along which right MONty is affected.

Table 5

↓MON↑	all		no	↓MON↓
↑MON↓	not all		some	↑MON↑

Given that the contextual information is preserved, then, replacing a causal *since* connective with *although* affected right MONty. We shall now move to examining the direction of MONty in the case of an *in order to* connection.

3.3. *In order to*

The following examples (with *in order to*) seem to have different monotonicity behaviour when compared to those with the causal/inference *since* summarised in Table 2.

hot

16. ↑MON↓ In order for the water to become warm, he put it on
. . . . .
the stove for quite a short time
(=...because it gets warm quickly)

17. ↑MON↓ If it is lukewarm, he will leave it a little (more) on the stove.
(=...it doesn't need more because it gets warm quickly)

warm

18. ↑MON↓ After it becomes lukewarm, he will leave it on the stove a
. . . . . .
little (more).
(=...because it gets warm quickly)

warm

19. ↑MON↑ If it becomes lukewarm, put it on the stove a lot (more).
(=...because it gets warm slowly)

hot

20. ↑MON↑ For it to become warm, he puts it on the
. . . . .
stove a lot (more).
(=...because it gets warm slowly)

warm

21. ↑MON↓ Because it is (already) lukewarm, he put it
. . . . .
on the stove for a short time
(=...because it gets warm quickly)

warm

22. ↑MON↓ After it became lukewarm, he put it on the stove
. . . . .
for a short time.
(=...because it gets warm quickly)

Table 6

	GETS WARM QUICKLY		GETS WARM SLOWLY	
	already	not yet	already	not yet
a. (cause/inference) since	↑MON↓	↓MON↓	↑MON↑	↓MON↑
b. in order to, after		↑MON↓ (16, 17, 18)		↑MON↑ (19, 20)
c. because, after	↑MON↓ (21, 22)		↑MON↑	

Table 6 summarises the direction pattern of the MONty of the above examples. Areas (a) and (c) of Table 6 indicate a uniform pattern of MONty, whereas (b) has a reversed left MONty. Whatever is expressed by the difference in left MONty which groups inference connection together with cause and time and separates them from purpose and time, it seems to be functioning along the diagonal axis in the square (Table 5).

What is the binary opposition expressed by a change in left MONty seems to be the extensionality/intensionality distinction.

Table 7

	NEGATION	
concession		extensionality
intensionality		

The *in order to* connective, thus, affects left MONty when it replaces a causal *since*.

3.4. The "*Though*"-adverb

We shall now use the same antecedent-consequent pair and speaker belief (ie. water gets *warm quickly*) and we shall attempt to create a connection which will exhibit upward (left and right) monotone behaviour. I expect. this type of connection will fill in the right lower corner of the square in Table 7,

———————*q*———————

24. ↑MON↑ He left it on the stove for quite some time...
———————*p*———————
it had got warm, though!

The above example could only make sense if we imagine the speaker — for instance — *wondering why q* rather than *inferring q* (as in *since p, q*).
What the connective (*though*) pairs with here, is a difference in the illocutionary force of the connection, which could be encoded by a combination of a type of negation with the illocutionary force of the original connection:

¬*infer/believe/guarantee* that *q*

In Greek, a language in which both types of concession (the *although*-connective and the *though*-adverb) can be realised by one single concessive connective, **αν και**, a causal/inference (*since*/**αφου**) and a concessive connective are interchangeable at this position.

24. Το άφησε στην φωτιά αρκετή ωρα ... αφου/αν και ειχε ζεσταθει! Αναρωτιέμαι γιατί τόκανε!

causal

concessive

(He left it on the stove for quite some time... it had got warm though! I wonder why he did that!)

Table 8 summarises the position of the connectives discussed above.

Table 8

	(although) concession	NEGATION		
↓MON↑		———————	EXTENTIONALITY cause...	↓MON↓
↑MON↓	INTENTIONALITY purpose...	——————— NEGATION	(though-adverb) concession, cause...	↑MON↑

4. RESTRICTION ON THE POWER OF MONty

So far, we have examined a quantifier property, MONty, with reference to adverbial clausal connection that relates to implication. We have indicated how the direction pattern of MONty is affected by changing the connective into a concessive, purposive, conditional one etc. The changes relate to the type of negation which combines either with the propositions p and q of the original implication or the illocutionary force of the utterance, and the intensionality vs. extensionality distinction (eg. purposive vs. causal subordination).

The picture that emerges looks like some version of the Square of Opposition and MONty seems to be gaining power as a cross-categorial constraint, since it can function as a fairly powerful criterion for differentiation in the area of clausal adverbial modification.

I have already pointed out a case in which a change of the connective into *although* did not reverse MONty. I would now like to focus on this, as it seems to diminish the explanatory power of MONty as a differentiating criterion among concessive vs. (eg.) causal connectives.

In Table 4 (ex. 10 & 13), the *although* concessive connection preserves the same MONty pattern as that of the original *since* (inference) connection, while in the other cases (ie. examples 11, 12, 14, 15) right MONty is affected. I would have to account for the condition on which MONty is cancelled as a differentiating criterion: this seems to be the case, when the original implication is shown to be *necessarily* valid in the speaker's world (the necessity operator combined with q in $p \rightarrow q$).

I shall repeat two of the examples in which the speaker's belief about what happens in the world is the same (ie. water gets warm quickly...), but indicate a different MONty pattern (examples 8 & 9 are repeated (below)

8. ↑MON↓ Since it is (already warm, quite a short time must have passed

. . . . . .

9. ↓MON↓ Since it is (still) lukewarm, a short time must cold have passed.

If the water is already warm and if it is true that *water* in our world *gets warm quickly*, then either a short or a long time may have passed (8). By contrast, if it is still cold and it is true that *water gets warm quickly*, the time that has passed must definitely be short (9).

MONty, that is, seems to be functioning on the condition that a necessity operator is present with the q of the implication the adverbial connection is based on.

5. MEANING LEVELS

The following table shows which part of MONty is affected across meaning levels. I shall indicate sameness and difference along meaning levels with a (+) and a (−).

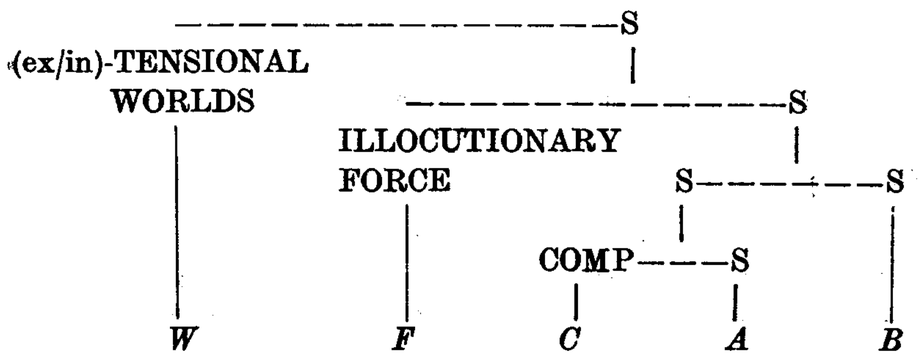
Table 9

MEANING LEVELS			
world	−	+	+
illocutionary force	+	−	+
verbal input: antecedent-consequent pair	+	+	−
PART OF MONty AFFECTED in the above examples with reference to meaning levels	left	left & right	right
CHANGES ALONG MEANING LEVELS CAUSED BY	duality	outer neg	inner neg

Notice that if we take into consideration which kind of negation is involved in signaling meaning differences along meaning levels, the picture seems to be parallel to what has been observed (van Benthem [1983c]) about the monotonicity behaviour of quantifiers being affected by the three kinds of negation.

The adverbial modification connectives dealt with above, thus, seem to fall into three classes — as shown below — according to the level of meaning one chooses to connect the negative element to. Table 10a presents a structure containing the relevant meaning levels.

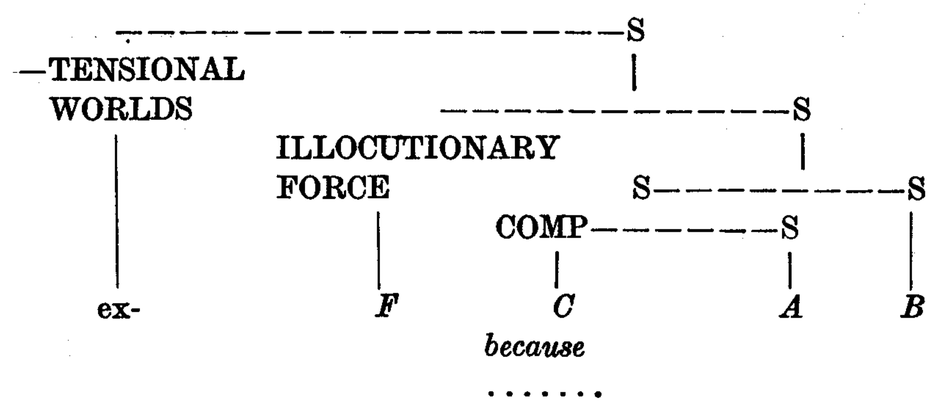
Table 10a



The terminal nodes *C*, *A* and *B* correspond to the connective and the clauses involved in the connection. *W* is a variable ranging over two options: ex-tensionality and in-tensionality. *F* is a variable name ranging over the open set of values, which the illocutionary potential of the utterance may take (eg. threatening, protesting, praising...).

A *because* group of connectives, then, would exhibit the following structure (Table 10b):

Table 10b

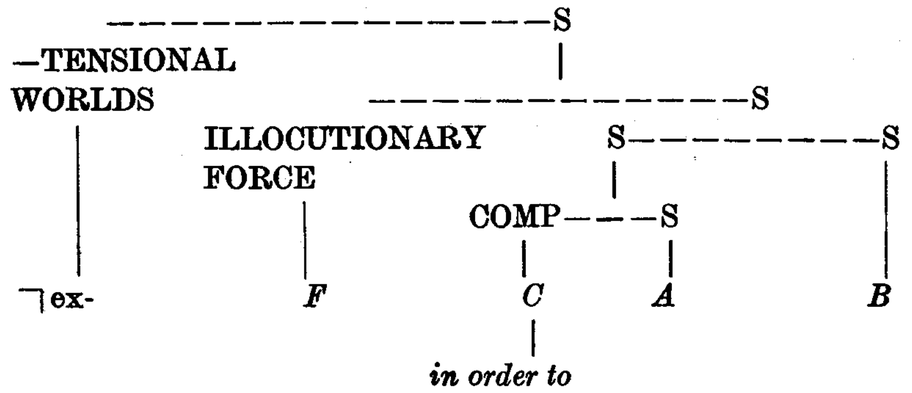


Whenever the negative element — participating to introduce a difference along meaning levels — signals a duality opposition (ie. intensionality vs. extensionality), LEFT MONty is affected.

A purposive connective, that is, could be considered as a combination of the above structure with a DUALITY negation at the world level.

In order to could exhibit the following structure:

Table 10c



When we deal with illocutionary force meaning differences — in which case the negation (¬) participating to introduce the difference is OUTER negation

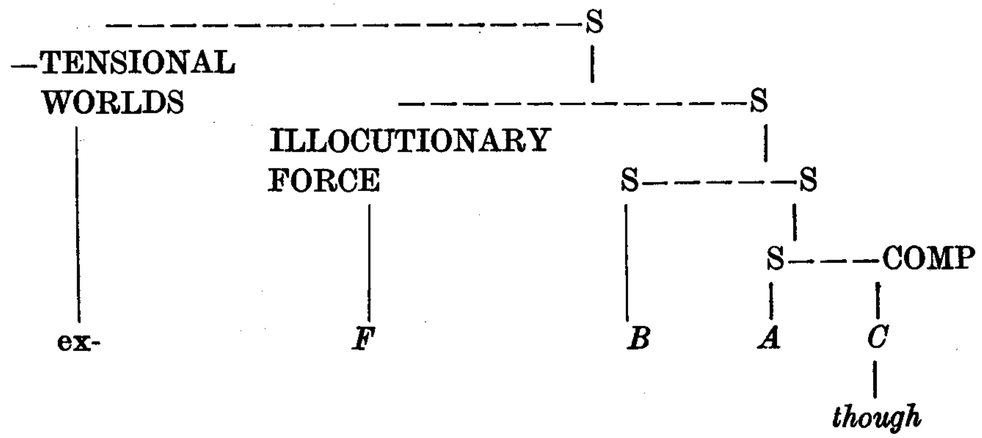
(=it is not the case that I
infer/believe/assure you that q, ex. (24)) —

both LEFT and RIGHT MONty are affected.

The type of negation involved here is outer negation, because the illocutionary force of the connection can take any value (eg. regret, protest...) except one: i.e. guaranteeing the truth of the conjuncts (eg. believe, infer, assure you...).

The *though*-adverb concession could possibly be seen as exhibiting the following structure:

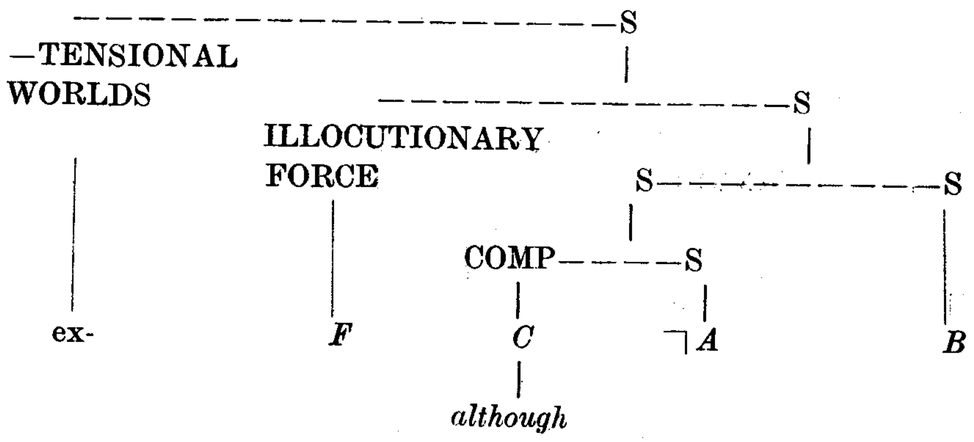
Table 10d



When the negation (¬) used to introduce meaning differences is INNER negation (ie. at the level of the actual verbal input of the utterance, the antecedent/consequent pair), RIGHT MONty is affected.

In 10e, below, there is inner negation (¬) associated with one of the conjuncts, *A* or *B*, as they were presented in 10b.

Table 10e



In the cases examined above, as we proceed from general to particular levels of meaning, MONty becomes reversible from left to right.

6. ALREADY, STILL, MORE

Despite the fact that MONty is sensitive to negation, on CERTAIN CONDITIONS (eg. same situation/speaker belief: water gets *warm quickly*), it can function as a differentiating criterion among categories related to the changes examined above. I shall attempt to draw the MONty pattern of *still*, *already* and *more* given a particular situation speaker belief/(water is getting warm) (quickly) and locate them on the square.

Examples (8)/(9) and (10)/(11) are repeated below. *Still* and *already* seem to be in complementary distribution as far as the left direction of the MONty of the connection is concerned:

(8′). ↑MON↓ Since it is *still warm, quite a short time must
already have passed

(9′). ↓MON↓ Since it is still lukewarm, quite a short time
*already must have passed

(10′). ↑MON↓ Although it is *still warm, quite a short time
already must have passed

(11′). ↓MON↑ Although it is still lukewarm, quite some time
*already must have passed

The (left) MONty context the adverbs can occur in is summarised in the following table:

Table 11

	(causal) *since*	*although*
already	↑MON	↑MON
still	↓MON	↓MON

The fact that they have identical behaviour in both types of connection is not surprising, as it has been noted that the change of the connective into *although* affects right MONty only. The MONty behaviour of these adverbs could be reversed (but will still be in complementary distribution) if we consider a different situation eg.

water gets *cold* quickly,

which — as shown above — affects left MONty, as well. Example (5) is repeated below as (5′):

(5′). ↑MON↓ Since it is still warm, quite a short time must have passed
*already
(=...because water gets *cold* quickly)

Still and *already*, thus occur in opposite left MONty contexts. They are appropriate along the upper horizontal axis (ex. 8—11, above) and the right vertical axis of the square (ex. (24) repeated below), but not along the diagonal one (ex. (16) repeated below).

(24′). ↑MON↑ He left it on the stove a lot *more*... it was *already* warm though!
(=Why did he do that? water gets warm quickly!)

(24″). ↓MON↓ He left it on the stove a little *more*... it was *still* cold though.
(=a little more may not be enough, because water gets warm slowly)

(16′). ↑MON↓ In order for the water to become warm (*already), he put it on the stove for quite a short time.
(=...because it gets warm quickly)

The Greek cluster of items ήδη/κιόλας/πιά (=already) have a similar distribution to that of *already*. Ηδη seems to be closer to *already* in that both κιόλας and πιά could be encountered in contexts like that of (16′) above (in which case they convey different meaning, ie. *also* and *eventually*, respectively).

Both *still* and *already* can only appear in extensional contexts. For this particular choice of situation/speaker belief, *still* appears as left downward monotone and *already* as left upward.

More, on the other hand, is not appropriate in extensional contexts (ex. 11 and 9 below), thus, functioning along the lower horizontal axis of the square. For this particular choice of situation/speaker belief *more* appears as left upward monotone.

(11′). ↓MON↑ Although it is *more lukewarm, quite some time must have passed.
(=...because it gets warm quickly)

(9′). ↓MON↓ Since it is *more lukewarm, a short time must have passed.
(=...because it gets warm quickly)

Table 12 summarises the possible positions for *still/already* and *more* on the square. The MONty context drawn below is that created with reference to the situation/speaker belief: water gets warm quickly.

Notice that it should not be mistaken for the MONty context generally appropriate for these adverbs. It can only be useful as a tool for differentiation (among adverbs) relative to a situation.

Table 12

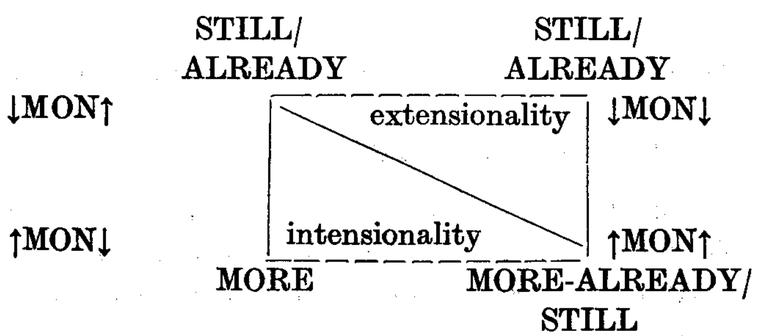
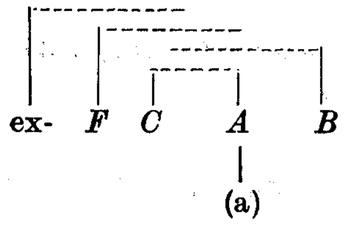


Table 13 (a—d) indicates the contexts appropriate for the adverbs in question, in terms of which levels of meaning are combined with negation.

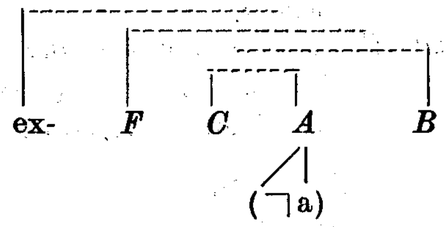
Table 13

a.



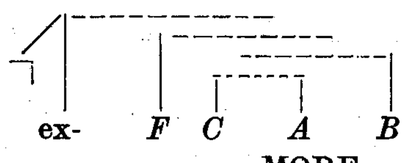
ALREADY
(example 8)

b.



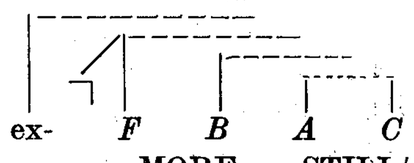
STILL
(example 9)

c.



MORE
(example 16)

d.



MORE STILL/
ALREADY
(example 24)

In 13 (b), negation at the antecedent level triggers *still*. *Already* and *stil*, seem to realise an instance of a duality opposition as they are combined with values which come from two different DOMAINS ON THE SCALE, the area above and below a level of accomplishment:

.....
hot
warm
———— LEVEL OF ACCOMPLISHMENT
lukewarm
cold
.....

This intuition is in accordance with the observation made in the literature that a duality opposition reverses left MONty: *still* and *already* differ in that they exhibit reversed left MONty, as shown in Table 11.

In 13 (c), negation (duality) at the world level triggers *more*.
In 13 (d), (outer) negation at the illocutionary force level creates both extensional and intensional contexts, thus triggering *still/already* and *more*, respectively.

7. CONCLUSION

We examined the MONty behaviour of four clasess of connectives, namely

(cause/inference) *since*,
although,
in order to,
the *though*-adverb.

These four types of "connectives "exhibited different MONty patterns which were also shown to constitute monotonicity contexts appropriate for adverbs like *already, still, more.*
The MONty patterns created were the result of a combination of a type of negation with a level of meaning (ex/in-tensionality, illocutionary force, antecedent-consequent level).
The MONty patterns drawn are not meant as fixed patterns defining the MONty picture of the above connections; they rather indicate the MONty behaviour (the reversibility pattern) of a particular type of connection relative to a situation/speaker belief (which in the cases examined was

water gets warm quickly)

REFERENCES

van Benthem, J. 1984. "The logic of semantics".. In Landman F. and Veltman Fr. (eds.) 1984. 55—80.
van Benthem, J. 1984 b. "Quantifiers and connectives." *Journal of Symbolic Logic 49/2*. 443—466.

Mc Cawley, D. J. 1981. *Everything that linguists have always wanted to know about logic — but were afraid to ask*. Oxford: Basil Blackwell.

Landman, F. and Veltman Fr. (eds). 1984. *Varieties of formal semantics. Proceedings of the fourth Amsterdam Colloquium, Sept. 1982*. Amsterdam: Foris.

Setatos M. 1986: "Ακόμη, πιά, μόλις, κιόλας.". *Studies in Greek linguistics — Proceedings of the 7th Annual Meeting of the Department of Linguistics, Faculty of Philosophy, Aristotelian University of Thessaloniki*. 163—175.

Sidiropoulou M. 1988. "Ποσοδεικτες και Συαδετικά" (Quantifiiers and connectives). *Studies in Greek linguistics — Proceedings of the 9th Annual Conference of the Department of Linguistics, Faculty of Philosophy, Aristotelian University of Thessaloniki*. 355—367.

Westerståhl, D. 1986. *Quantifiers in formal and natural language*. Centre for the Study of Language and Information. Report No. CSLI — 86—55. Stanford: University of Stanford Press.